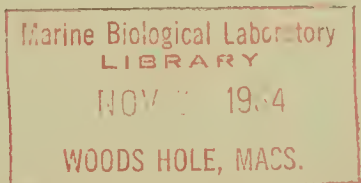


ANNUAL FISH PASSAGE REPORT - ROCK ISLAND COLUMBIA RIVER, WASHINGTON, 1962

by Paul D. Zimmer and John H. Broughton



SPECIAL SCIENTIFIC REPORT-FISHERIES No. 467

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR
Stewart L. Udall, *Secretary*
James K. Carr, *Under Secretary*
Frank P. Briggs, *Assistant Secretary for Fish and Wildlife*
FISH AND WILDLIFE SERVICE, Clarence F. Pautzke, *Commissioner*
BUREAU OF COMMERCIAL FISHERIES, Donald L. McKernan, *Director*

**ANNUAL FISH PASSAGE REPORT -
ROCK ISLAND DAM
COLUMBIA RIVER, WASHINGTON
1962**

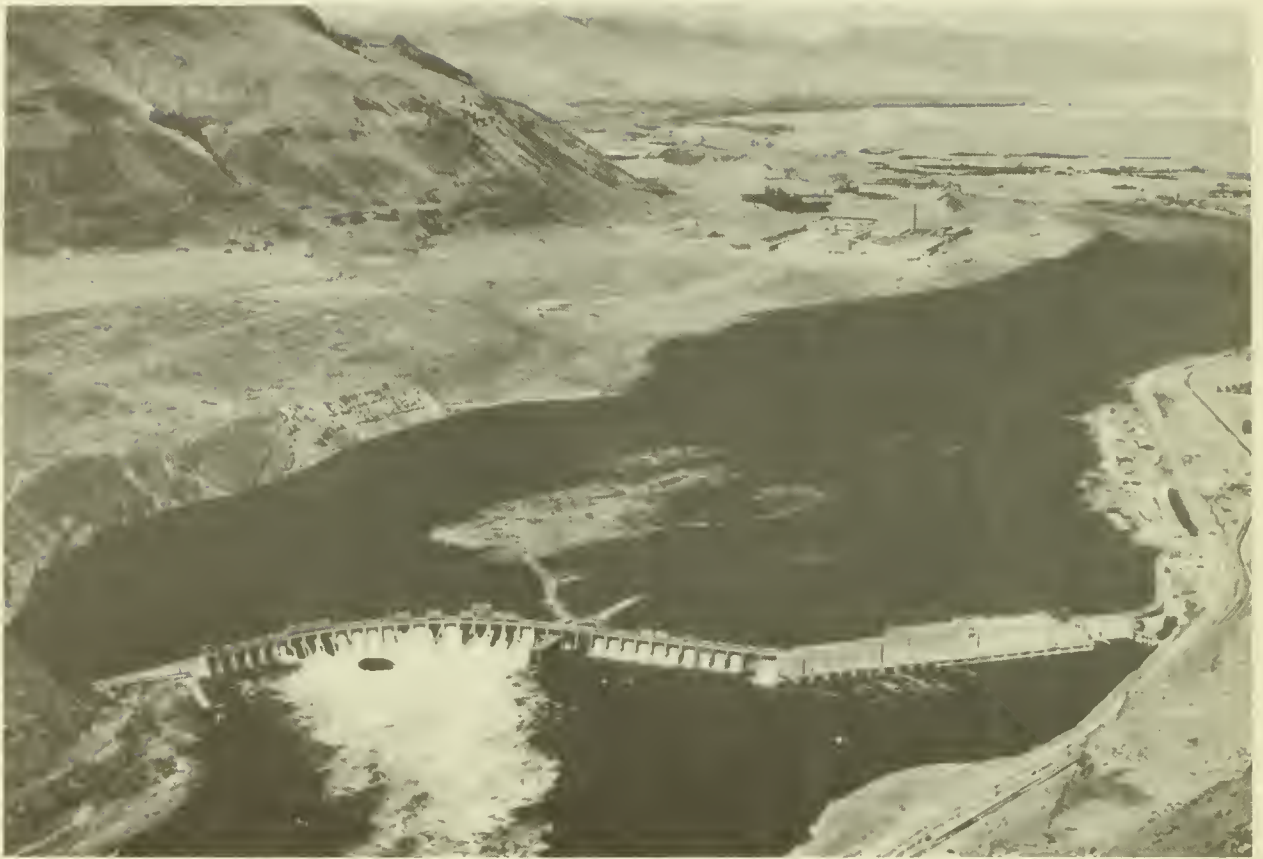
by

Paul D. Zimmer and John H. Broughton



United States Fish and Wildlife Service
Special Scientific Report--Fisheries No. 467

Washington, D.C.
August 1964



Rock Island Dam, Columbia River, Wash.

CONTENTS

	Page
Introduction.....	1
Counting procedures	2
Enumeration of fish	2
Chinook salmon, <i>Oncorhynchus tshawytscha</i>	2
Chinook salmon jacks.....	2
Sockeye salmon, <i>Oncorhynchus nerka</i> (blueback or red).....	2
Coho salmon, <i>Oncorhynchus kisutch</i> (silver).....	2
Steelhead trout, <i>Salmo gairdneri</i>	3
Miscellaneous fish	3
Weather and river discharge data.....	3
Activities and observations	3
Summary.....	6

ANNUAL FISH PASSAGE REPORT - ROCK ISLAND DAM

COLUMBIA RIVER, WASHINGTON, 1962

by

Paul D. Zimmer, Fishery Biologist (Management)
and John H. Broughton, Fishery Technician

ABSTRACT

Fish using the three fishways at Rock Island Dam in 1962 were counted from May 1 to October 27. Total number of salmon and steelhead trout exceeded the 1961 count by approximately 12,300 fish.

The 1962 count of 34,154 chinook salmon was well above the mean of 16,178 for the 29-year period 1933-61 and exceeded the 1961 count by approximately 1,100 fish. The 29,253 sockeye salmon counted was approximately 10,000 more than recorded in 1961 and approximately 57 percent of the 29-year mean of 51,920. The 737 coho salmon were approximately 500 more than recorded in 1947, year of previous high count, and greatly exceeded the 50 fish in 1961. The number of steelhead trout passing Rock Island Dam in 1962 was the highest recorded since counting began in 1933 and was more than twice the 29-year mean of 3,189. Fish other than salmon and steelhead trout passing through the fishways at Rock Island Dam in 1962 numbered 164,574 and exceeded the count of salmon and steelhead trout by approximately 93,000 fish.

Of 71,735 salmon and steelhead trout observed at Rock Island Dam in 1962, approximately 0.5 percent had some visible evidence of injury about the head or body.

INTRODUCTION

This report on passage of fish at Rock Island Dam during 1962 provides information on operation of fishways and numbers of fish utilizing upstream fish passage facilities.

Rock Island Dam, located on the Columbia River approximately 12 miles downstream from the city of Wenatchee, Wash., has been in operation since 1933. The plant is owned and operated by Chelan County Public Utility District No. 1.

Rock Island Dam is now equipped with three fishways: one located on the right bank, another on the left bank, and the third approximately in the center of the dam. Two of the fish ladders were placed in operation in 1933, and the third (middle ladder) was constructed in 1935-36. All three ladders have undergone significant modifications since initial construction.

Fish have been counted at Rock Island Dam annually since 1933--the longest continuous record in the Columbia River.

Included in this report are comments covering various fishery investigations at Rock Island Dam during 1962.

Note.--Paul D. Zimmer and John H. Broughton, Bureau of Commercial Fisheries Columbia Fisheries Program Office, U.S. Fish and Wildlife Service, Portland, Oreg.

COUNTING PROCEDURES

Fish counting in 1962 began on May 1 and terminated on October 27. From May 1 through September 13, fish were counted 16 hours each day, starting at 5 a.m. and ending at 9 p.m. From September 14 through October 27, counting was reduced to conform to the hours of daylight available.

Fish counters were allowed a 15-minute rest period at the end of each hour; and during all periods of noncounting, ladders were closed to passage of fish.

ENUMERATION OF FISH

Chinook Salmon, *Oncorhynchus tshawytscha*

The 1962 chinook salmon count of 34,154 (jacks included) was well above the mean of 16,178 for the 29-year period 1933-61. It was also greater than the 1961 count, but only 67 percent of the record count of 50,713 in 1957 (table 1). Monthly totals of chinook salmon counted are given in table 2. Maximum day's count of chinook salmon, jacks not included, in 1962 was 570 on August 10 (table 3). Tables 4 and 5 show semimonthly totals of the number and percentage of chinook salmon counted over each fish ladder. Of the chinook salmon (jacks excluded) which passed Rock Island Dam in 1962, 65.6 percent ascended the left ladder, while 13.5 and 20.9 percent ascended the middle and right ladders, respectively. The count of 8 chinook salmon on May 1, 1962, is in sharp contrast to the 137 on the same date in 1961.

Chinook Salmon Jacks

Some chinook salmon return from the ocean as mature fish in the year following their seaward migration and are referred to as "jacks." These fish are small and predominantly males. It has been determined at Rock Island Dam that up to June 30 of each year, jacks rarely, if ever, exceed 18 inches in length, while other chinook salmon are much larger. Likewise, from July 1 to the end of

the season, jacks rarely, if ever, exceed 22 inches in length. Consequently, jacks at Rock Island Dam are identified as all chinook salmon 18 inches or less in length prior to July 1 and 22 inches or less in length after that date. The maximum daily count of 173 jacks occurred on August 7 (table 3). The 7,118 fish recorded as jacks constitute 20.8 percent of the 1962 chinook salmon run as compared to 28.0 percent in 1961.

Table 5 shows the number and percentage of chinook salmon jacks counted over each fish ladder. Monthly totals are given in table 2.

Sockeye Salmon, *Oncorhynchus nerka* (Blueback or Red)

The 1962 sockeye salmon count of 29,253 was 56 percent of the 29-year mean of 51,920 (table 1). In 1962, peak of the run was reached on July 21, when 2,541 fish were counted through the fishways at Rock Island Dam.

Table 6 shows semimonthly totals of the number and percentage of sockeye salmon counted over each ladder. Of the sockeye salmon passing Rock Island Dam in 1962, 48.3 percent ascended the left ladder, while 21.7 and 30.0 percent ascended the middle and right ladders, respectively. Data pertaining to sockeye salmon daily counts are in tables 9-14. Monthly totals of sockeye salmon counted in 1962 are in table 2.

Coho Salmon, *Oncorhynchus kisutch* (Silver)

The 1962 coho salmon count of 737 fish greatly exceeded the 29-year mean of 60 and the 1961 count of 50 (table 1). Additional data are shown in tables 7, 12, 13, and 14. Maximum day's count of 70 fish occurred on September 27 (table 3). In 1961, maximum day's count of 8 fish occurred on October 4. The first coho salmon appearing at Rock Island Dam in 1962 was observed 14 days prior to the initial count of this species of salmon in 1961. Of the coho salmon passing the dam in 1962, 77.3 percent utilized the left ladder, while 3.9 and 18.8 percent ascended the middle and right ladders, respectively.

Steelhead Trout, *Salmo gairdneri*

The 1962 steelhead trout count of 7,591 was almost two and one-half times greater than the 29-year mean of 3,189 (table 1). The count of 15 steelhead on May 1, 1962, was slightly more than one-third the count of 44 on the same day in 1961.

The greatest monthly number of steelhead passing through the fishways in 1962 occurred in September when 3,429 fish were recorded. Peak monthly movement of these fish in 1961 also occurred in September when 3,508 fish were counted.

Of the steelhead passing Rock Island Dam in 1962, 70.7 percent utilized the left ladder, while 12.1 and 17.2 percent ascended the middle and right ladders, respectively.

Additional data pertaining to the movement of steelhead trout at Rock Island Dam are contained in tables 8-14.

Maximum day's count in 1962 was 284 on September 28 (table 3). In 1961, maximum day's count of 269 occurred on September 19.

Table 8 shows semimonthly totals of the number and percentage of steelhead trout counted over each fish ladder.

Miscellaneous Fish

In 1962, enumeration was made of species of fish other than salmon and steelhead trout passing Rock Island Dam (tables 15-20). No claims are made as to complete accuracy of identification of these fish. It is felt, however, that the degree of accuracy is consistent with that maintained at other dams on the Columbia River and as such may be used as a rough index of abundance of these fish. In 1962, approximately 165,000 fish other than salmon and steelhead trout passed Rock

Island Dam. Species of fish included are: largescale sucker, *Catostomus macrocheilus* Girard; longnose sucker, *Catostomus catostomus* (Forster); squawfish, *Ptychocheilus oregonense* (Richardson); Rocky Mountain whitefish, *Prosopium williamsoni* (Girard); Columbia River chub, *Mylocheilus caurinus* (Richardson); chisel-mouth, *Acrocheilus alutaceus* Agassiz and Pickering; carp, *Cyprinus carpio*, Linnaeus; lamprey, *Entosphenus tridentatus* (Gairdner); shad, *Alosa sapidissima* (Wilson); Dolly Varden trout, *Salvelinus malma* (Walbaum); and rainbow trout, *Salmo gairdneri* (Richardson). The number of miscellaneous species of fish passing through the fishways was 2.3 times the total salmon and steelhead trout recorded.

WEATHER AND RIVER DISCHARGE DATA

Headwater and tailwater elevations are plotted on figures 1 and 2, respectively. Air temperatures were taken twice daily by pocket thermometer. Water temperatures were taken at the middle fish ladder by recording thermograph. Daily records of weather conditions and stream flows are shown on tables 9-14. Daily river discharge data are plotted on figure 3. Maximum daily discharge of 326,900 c.f.s. on June 5, 1962, was slightly less than two-thirds the flow of 488,500 c.f.s. on the same day in 1961. Maximum daily discharge of 526,900 c.f.s. in 1961 occurred on June 12. Maximum water temperature in 1962 of 65 degrees occurred on July 28 and 29. Maximum water temperature in 1961 of 67 degrees occurred on August 21.

ACTIVITIES AND OBSERVATIONS

As in past years of counting at Rock Island Dam, some fish were observed with cuts or abrasions on the body. Of 71,735 salmon and steelhead observed as they passed over the counting boards, 364, or approximately 0.5 percent, had injuries of some sort either on the body or about the head. Of 40,764 salmon and steelhead observed in 1961, 1.0 percent had injuries about the head or body. Since in

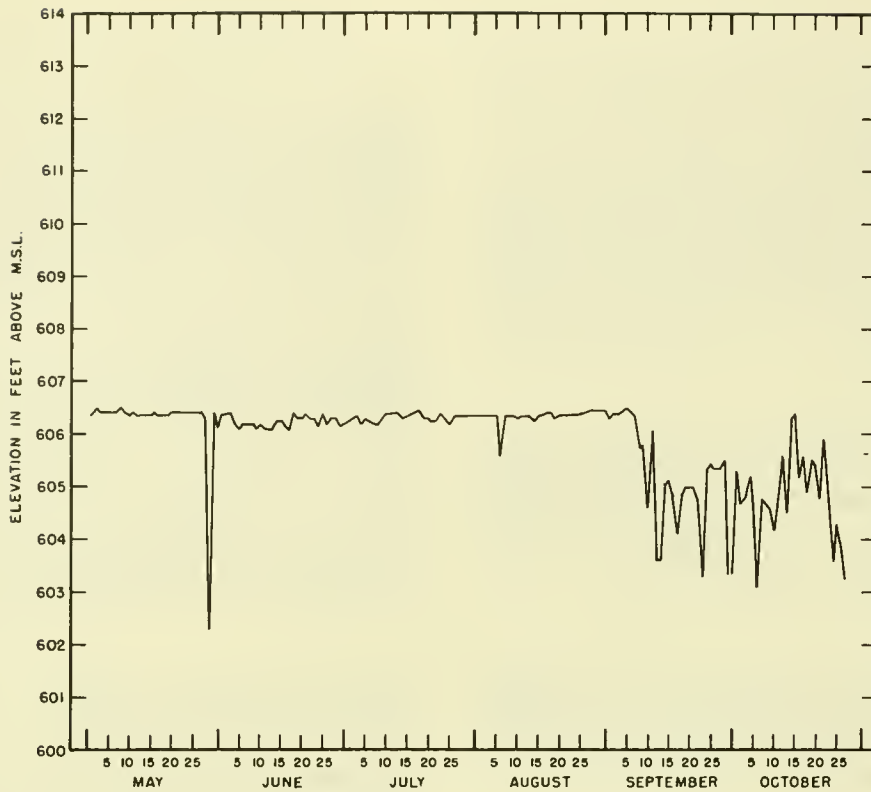


Figure 1.--Headwater elevations, Rock Island Dam, May 1 to October 27, 1962.

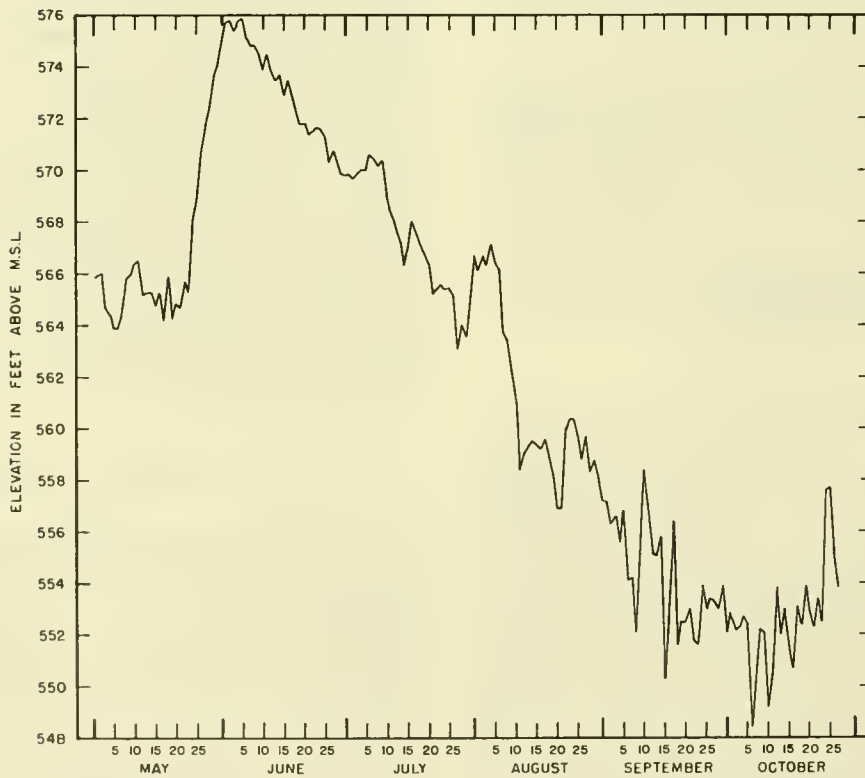


Figure 2.--Tailwater elevations, Rock Island Dam, May 1 to October 27, 1962.

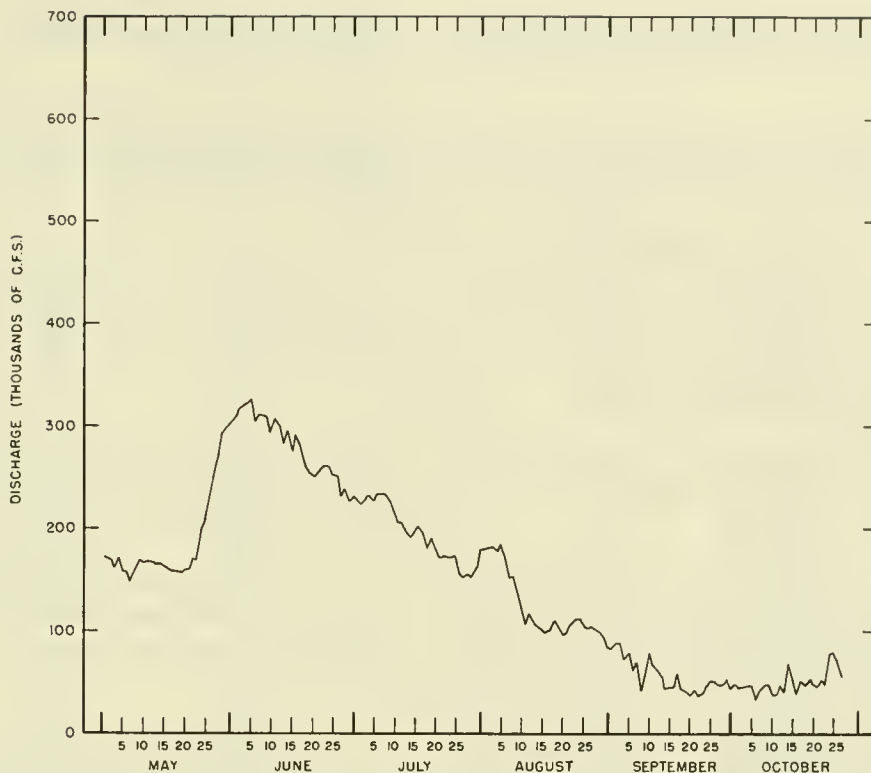


Figure 3.--Daily river discharge, Rock Island Dam, May 1 to October 27, 1962.

both years of observation the counters could see only the top and one side of the fish, the incidence of injury was probably greater than indicated. Percentages of injured fish observed in the left, middle, and right ladders in 1962 were 68, 10, and 22 percent, respectively.

In 1962, injuries were most numerous on large chinook and sockeye salmon (table 21). Of the 7,591 steelhead observed, only 16 fish showed evidence of injuries. Very few chinook salmon jacks displayed visible external injuries. It is of interest to note that of 737 coho salmon examined, only 3 fish showed evidence of visible injuries.

As in 1961, circular cuts or abrasions about 1 inch in diameter were more prevalent among the sockeye salmon. The most prevalent injury among the large chinook salmon was a deep cut along the side of the body or on the head. Some of these cuts or gashes were estimated to be as long as 6 inches and from

one-quarter to one-half inch deep. Some of the injuries were newly made, as evidenced by the presence of bloody tissue. Others appeared to have been made earlier, as scar tissue had formed. In some instances, large injuries or abrasions were covered with fungus growth. The greatest number of injuries occurred in July and August.

In the period July 17 to July 26, 1,024 sockeye salmon were trapped in the left bank fishway. These fish were tagged as part of a study to measure the effectiveness of the fishways at Rocky Reach Dam, located approximately 20 miles upstream from Rock Island Dam. All tagged fish were released into the forebay of Rock Island Dam. In the period July 21 to July 26, 16 of these tagged fish were again counted through the fishways at Rock Island Dam, indicating that some of the fish proceeded downstream after release and came up through the fishways a second time.

The five times that dewatering of the fishways at Rock Island Dam occurred in 1962 were as follows:

1. Right fish ladder, from 8:00 a.m., April 26, to 4:45 p.m., April 27, for routine maintenance work.

2. Left fish ladder, from 9:20 a.m. to 2:30 p.m., June 4, for repair of weir chains.

3. Left fish ladder, from 10:50 a.m. to 12:30 p.m., August 1, shutoff of auxiliary water to permit examination of fish ladder.

4. Right fish ladder, from 12:00 noon to 3:40 p.m., October 4, for repairs to ladder weirs.

5. Left fish ladder, October 22, closed for 50 minutes in the afternoon to permit recovery of items inadvertently dropped in fish ladder.

Frequent inspections were made of fishway operations by State and Federal personnel throughout the counting season. From May 27 to 29, studies were made by fisheries personnel and members of Chelan County Public Utility District of different spillway gate operations.

SUMMARY

1. The total Rock Island Dam count of salmon and steelhead in 1962 was 71,735, which was approximately 12,300 more than the 1961 count.

2. Annual counts of salmon and steelhead passing Rock Island Dam during the period 1933-62, inclusive, are given in table 1.

3. The chinook salmon count of 34,154 in 1962 was approximately 1,100 more than in 1961 and slightly more than one-half the peak year of 1957. In 1962, 7,118 jacks were re-

corded, representing 21 percent of that year's total of chinook salmon counted.

4. The sockeye count of 29,253, which exceeded the 1961 count by approximately 10,000 fish, was approximately 22,700 less than the 29-year mean of 51,920.

5. Very few coho salmon have appeared at Rock Island Dam in the period 1933-62. The 1962 count of 737 fish was more than three times the previous high count of 229 in 1947.

6. The steelhead count of 7,591 in 1962 was almost two and one-half times greater than the 29-year mean of 3,189 and was the highest recorded in the period 1933-62.

7. In 1962, a greater percentage of salmon and steelhead utilized the left bank fish ladder than used either the middle or right bank ladders.

8. Fish counting in 1962 began on May 1 and terminated October 27. From May 1 through September 13, fish were counted for 16 hours each day. From September 14 through October 27, counting was reduced to conform to the hours of daylight available.

9. In 1962 the maximum number of salmonids counted in 1 day (2,692) was on July 21.

10. Season's total of fish other than salmon and steelhead trout passing Rock Island Dam in 1962 was 164,574 and was composed of the following: sucker, 100,401; squawfish, 10,944; whitefish, 38,309; chub, 10,105; carp, 1,756; shad, 1; Dolly Varden and rainbow trout, 61; and lamprey, 2,997.

11. Of 71,735 fish examined, on the top and one side only as they passed over the counting boards, approximately 0.5 percent had injuries of some type either on the body or about the head. Greatest numbers of injured fish occurred in July and August. Injuries were most numerous on large chinook and sockeye salmon.

Table 1.--Annual counts and periods of counting of salmon and steelhead trout at Rock Island Dam, 1933-62¹

[Number of fish]

Year	Chinook salmon	Steelhead trout	Sockeye salmon	Coho salmon	Total	Period of count
1933	5,668	1,055	40,737	182	47,642	7/21- 9/23
1934	7,115	583	2,227	69	9,994	7/31-12/31
1935	16,305	5,418	14,013	11	35,747	1/1 -11/15
1936	7,290	2,373	16,500	0	26,163	5/5 - 9/29
1937	5,133	2,214	15,089	58	22,494	5/11-10/16
1938	5,795	2,399	17,095	78	25,367	4/12-10/29
1939	11,206	5,425	19,591	13	36,235	5/1 -12/9
1940	9,512	5,220	27,093	2	41,827	3/5 -12/10
1941	2,507	3,513	963	28	7,011	4/1 -12/8
1942	6,833	3,693	16,340	1	26,867	4/10-11/30
1943	11,129	2,315	17,522	15	30,981	4/5 -11/30
1944	3,364	1,338	5,035	186	9,923	4/12-11/17
1945	5,699	1,118	7,148	166	14,131	4/4 -12/17
1946	9,981	1,779	45,030	32	56,822	1/4 -11/5
1947	11,717	1,971	79,831	229	93,748	1/1 -11/27
1948	7,083	2,360	84,184	29	93,656	1/1 -11/16
1949	12,353	2,470	18,600	40	33,463	1/1 -11/15
1950	10,348	1,852	50,134	72	62,406	1/1 -11/23
1951	18,752	3,121	101,826	8	123,707	1/1 -11/18
1952	20,121	2,883	114,349	27	137,380	1/1 -11/18
1953	31,080	4,001	151,747	40	186,868	1/1 -12/31
1954	33,283	5,406	91,234	44	129,967	1/1 -12/31
1955	25,658	3,141	155,055	39	183,893	5/1 - 9/30
1956	25,085	1,540	92,443	29	119,097	5/1 - 9/29
1957	50,713	3,927	71,261	27	125,928	5/1 - 9/28
1958	32,457	3,970	98,695	60	135,182	5/1 - 9/30
1959	23,352	4,138	72,351	118	99,959	5/4 - 9/30
1960	26,550	6,226	60,341	94	93,211	5/2 -10/29
1961	33,067	7,042	19,233	50	59,392	5/1 -10/27
1962	34,154	7,591	29,253	737	71,735	5/1 -10/27

¹ Annual counts of salmon and steelhead trout given are now considered to be the official record of fish passing Rock Island Dam in period 1933-62.

Table 2.--Monthly number of salmon and steelhead counted at
Rock Island Dam, 1962

Species	May	June	July	August	Sept.	Oct.	Total
Chinook	5,472	2,318	6,576	7,392	4,709	569	27,036
Chinook (jacks)	394	589	1,600	2,980	1,454	101	7,118
Steelhead	731	58	158	1,384	3,429	1,831	7,591
Sockeye	2	50	24,762	4,143	282	14	29,253
Coho	0	0	0	1	504	232	737
Totals	6,599	3,015	33,096	15,900	10,378	2,747	71,735

Table 3.--Maximum daily counts, salmon and steelhead,
Rock Island Dam, 1962

Species	Date	Number of fish
Chinook (except jacks)	Aug. 10	570
Chinook (jacks)	Aug. 7	173
Steelhead	Sept. 28	284
Sockeye	July 21	2,541
Coho	Sept. 27	70

Table 4.--Number and percent of chinook salmon counted over
each fish ladder, Rock Island Dam, 1962
(jacks not included)

Date		Left ladder		Middle ladder		Right ladder		Total
		<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>
May	1-15	1,784	51.9	894	26.0	757	22.1	3,435
May	16-31	1,010	49.6	432	21.2	595	29.2	2,037
June	1-15	300	48.2	261	42.0	61	9.8	622
June	16-30	895	52.8	368	21.7	433	25.5	1,696
July	1-15	2,512	64.7	453	11.7	920	23.6	3,885
July	16-31	1,915	71.2	266	9.9	510	18.9	2,691
Aug.	1-15	3,918	73.8	407	7.7	986	18.5	5,311
Aug.	16-31	1,715	82.4	143	6.9	223	10.7	2,081
Sept.	1-15	1,782	75.7	159	6.8	413	17.5	2,354
Sept.	16-30	1,549	65.8	203	8.6	603	25.6	2,355
Oct.	1-15	297	64.2	44	9.5	122	26.3	463
Oct.	16-27	68	64.2	16	15.1	22	20.7	106
Totals		17,745	65.6	3,646	13.5	5,645	20.9	27,036

Table 5.--Number and percent of chinook salmon jacks counted over each fish ladder, Rock Island Dam, 1962

Date		Left ladder		Middle ladder		Right ladder		Total
		<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>
May	1-15	56	34.2	54	32.9	54	32.9	164
May	16-31	104	45.2	81	35.2	45	19.6	230
June	1-15	121	40.6	124	41.6	53	17.8	298
June	16-30	107	36.8	102	35.0	82	28.2	291
July	1-15	125	37.1	93	27.6	119	35.3	337
July	16-31	737	58.3	213	16.9	313	24.8	1,263
Aug.	1-15	1,401	77.7	106	5.9	297	16.4	1,804
Aug.	16-31	1,040	88.4	68	5.8	68	5.8	1,176
Sept.	1-15	657	76.4	45	5.2	158	18.4	860
Sept.	16-30	430	72.4	38	6.4	126	21.2	594
Oct.	1-15	63	71.6	7	7.9	18	20.5	88
Oct.	16-27	8	61.5	1	7.7	4	30.8	13
Totals		4,849	68.1	932	13.1	1,337	18.8	7,118

Table 6.--Number and percent of sockeye salmon counted
over each ladder, Rock Island Dam, 1962

Date		Left ladder		Middle ladder		Right ladder		Total
		<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>
May	1-15	0	0	0	0	0	0	0
May	16-31	1	50.0	0	0	1	50.0	2
June	1-15	4	80.0	1	20.0	0	0	5
June	16-30	22	48.9	10	22.2	13	28.9	45
July	1-15	1,604	47.3	744	21.9	1,044	30.8	3,392
July	16-31	10,018	46.9	4,739	22.2	6,613	30.9	21,370
Aug.	1-15	1,697	50.2	716	21.2	967	28.6	3,380
Aug.	16-31	546	71.6	104	13.6	113	14.8	763
Sept.	1-15	165	72.7	25	11.0	37	16.3	227
Sept.	16-30	44	80.0	3	5.5	8	14.5	55
Oct.	1-15	14	100.0	0	0	0	0	14
Oct.	16-27	0	0	0	0	0	0	0
Totals		14,115	48.3	6,342	21.7	8,796	30.0	29,253

Table 7.--Number and percent of coho salmon counted
over each ladder, Rock Island Dam, 1962

Date	Left ladder		Middle ladder		Right ladder		Total
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>
May 1-15	0	0	0	0	0	0	0
May 16-31	0	0	0	0	0	0	0
June 1-15	0	0	0	0	0	0	0
June 16-30	0	0	0	0	0	0	0
July 1-15	0	0	0	0	0	0	0
July 16-31	0	0	0	0	0	0	0
Aug. 1-15	0	0	0	0	0	0	0
Aug. 16-31	0	0	0	0	1	100.00	1
Sept. 1-15	28	93.3	0	0	2	6.7	30
Sept. 16-30	354	74.7	22	4.6	98	20.7	474
Oct. 1-15	169	81.2	6	2.9	33	15.9	208
Oct. 16-27	19	79.2	1	4.1	4	16.7	24
Totals	570	77.3	29	3.9	138	18.8	737

Table 8.--Number and percent of steelhead trout counted
over each ladder, Rock Island Dam, 1962

Date		Left ladder		Middle ladder		Right ladder		Total
		<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Number</i>
May	1-15	136	29.4	166	35.9	161	34.7	463
May	16-31	96	35.8	71	26.5	101	37.7	268
June	1-15	8	19.5	26	63.4	7	17.1	41
June	16-30	12	70.6	4	23.5	1	5.9	17
July	1-15	9	64.3	1	7.1	4	28.6	14
July	16-31	70	48.6	33	22.9	41	28.5	144
Aug.	1-15	361	67.7	46	8.6	126	23.7	533
Aug.	16-31	654	76.8	80	9.4	117	13.8	851
Sept.	1-15	794	76.1	81	7.8	168	16.1	1,043
Sept.	16-30	1,844	77.3	213	8.9	329	13.8	2,386
Oct.	1-15	1,047	75.8	153	11.1	182	13.1	1,382
Oct.	16-27	334	74.4	42	9.4	73	16.2	449
Totals		5,365	70.7	916	12.1	1,310	17.2	7,591

Table 9.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, May 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow	Chinook	Sockeye	Coho	Steelhead	Total
	Max.	Min.	Max.	Min.						
	°F.	°F.	°F.	°F.	C. f. s.	Number	Number	Number	Number	Number
May 1	74	40	46	46	173,400	8	0	0	15	23
2	67	45	47	46	170,000	15	0	0	21	36
3	60	45	47	46	162,200	8	0	0	16	24
4	65	33	47	46	172,300	20	0	0	19	39
5	60	36	48	47	155,800	41	0	0	26	67
6	64	41	47	47	155,800	309	0	0	56	365
7	64	40	48	47	147,800	196	0	0	35	231
8	60	50	48	48	162,200	383	0	0	15	398
9	58	46	50	48	168,800	473	0	0	85	558
10	60	48	50	49	166,500	350	0	0	29	379
11	60	46	51	50	167,700	353	0	0	25	378
12	65	45	51	50	167,700	302	0	0	31	333
13	60	47	51	50	165,400	514	0	0	41	555
14	75	46	52	50	165,400	315	0	0	16	331
15	67	52	52	51	163,300	312	0	0	33	345
16	78	50	52	52	160,000	150	0	0	21	171
17	75	60	52	51	155,800	352	0	0	11	363
18	74	50	52	51	154,800	226	0	0	24	250
19	68	47	52	51	155,800	288	0	0	28	316
20	74	54	52	51	161,200	220	0	0	28	248
21	79	54	53	51	160,100	83	0	0	11	94
22	80	51	52	52	171,100	136	0	0	15	151
23	52	51	52	51	168,800	152	0	0	12	164
24	65	51	52	51	198,000	84	0	0	17	101
25	65	50	52	51	209,900	121	0	0	15	136
26	75	54	52	51	231,500	122	1	0	14	137
27	75	54	52	51	252,300	83	1	0	17	101
28	72	61	53	51	267,500	40	0	0	7	47
29	68	52	52	52	293,500	45	0	0	17	62
30	68	50	53	52	299,200	59	0	0	23	82
31	72	54	53	52	301,100	106	0	0	8	114

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 10.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, June 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow C. f. s.	Chinook Number	Sockeye Number	Coho Number	Steelhead Number	Total Number
	Max.	Min.	Max.	Min.						
June 1	75	52	54	52	309,900	84	0	0	10	94
2	63	58	53	53	315,100	79	0	0	1	80
3	73	42	53	52	318,600	73	0	0	6	79
4	73	45	54	52	320,300	48	0	0	5	53
5	66	52	55	53	326,900	83	0	0	1	84
6	77	49	55	54	306,400	63	0	0	0	63
7	86	58	56	54	311,600	58	0	0	6	64
8	89	63	57	55	308,100	82	1	0	3	86
9	80	56	57	55	291,600	50	0	0	3	53
10	76	57	57	55	297,300	63	3	0	1	67
11	82	52	57	55	308,100	40	1	0	1	42
12	76	60	57	56	302,900	87	0	0	3	90
13	62	51	56	55	282,000	68	0	0	1	69
14	82	53	56	55	295,400	21	0	0	0	21
15	91	62	57	55	276,600	21	0	0	0	21
16	88	66	57	56	291,600	64	0	0	1	65
17	83	61	57	56	282,000	20	1	0	1	22
18	88	59	57	56	265,700	51	0	0	2	53
19	91	60	57	56	255,600	56	1	0	1	58
20	89	64	57	56	252,300	86	3	0	2	91
21	88	60	58	56	250,600	53	2	0	0	55
22	90	64	58	57	257,300	104	17	0	0	121
23	86	62	58	57	260,900	69	3	0	2	74
24	95	66	58	57	260,900	100	0	0	0	100
25	92	70	58	57	253,900	76	0	0	1	77
26	75	56	59	58	252,300	156	2	0	0	158
27	79	54	59	58	233,100	169	3	0	2	174
28	85	52	59	58	237,800	173	1	0	1	175
29	93	58	59	58	228,500	469	5	0	2	476
30	86	62	59	58	231,500	341	7	0	2	350

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 11.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, July 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow	Chinook	Sockeye	Coho	Steelhead	Total
	Max.	Min.	Max.	Min.						
	°F	°F	°F	°F	C. f. s.	Number	Number	Number	Number	Number
July 1	72	58	59	58	227,000	409	40	0	0	449
2	75	45	59	58	224,100	345	16	0	2	363
3	72	53	59	58	230,000	319	23	0	1	343
4	79	52	59	58	233,100	283	36	0	1	320
5	70	56	59	58	228,500	299	54	0	0	353
6	72	53	59	58	234,700	288	69	0	3	360
7	84	52	60	58	234,700	113	90	0	2	205
8	91	52	60	59	237,800	367	163	0	1	531
9	91	68	60	60	225,500	209	96	0	0	305
10	92	64	61	60	215,300	271	140	0	0	411
11	94	68	61	60	207,200	336	292	0	0	628
12	87	66	62	61	204,500	278	389	0	0	667
13	75	63	62	60	195,400	267	416	0	0	683
14	83	59	62	60	186,500	200	636	0	0	839
15	85	54	62	61	195,400	238	932	0	3	1,171
16	83	61	62	61	201,800	239	745	0	1	985
17	73	57	61	61	196,700	273	788	0	3	1,064
18	85	58	61	60	181,700	196	1,272	0	6	1,474
19	88	59	61	60	190,200	187	1,587	0	2	1,776
20	91	63	61	61	182,900	206	1,733	0	6	1,945
21	97	67	61	61	171,100	151	2,541	0	0	2,692
22	94	68	62	61	173,400	187	2,133	0	12	2,332
23	108	73	63	62	172,300	273	1,702	0	2	1,977
24	97	74	63	62	172,300	303	1,956	0	5	2,264
25	104	74	63	62	174,600	210	1,237	0	5	1,452
26	102	76	64	62	156,900	270	1,544	0	7	1,821
27	95	72	64	63	151,800	248	1,160	0	10	1,418
28	102	71	65	63	156,900	165	880	0	18	1,063
29	99	73	65	63	152,800	263	853	0	24	1,140
30	102	68	64	62	165,400	333	573	0	18	924
31	98	68	63	62	179,200	450	666	0	25	1,141

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 12.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, August 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow C. f. s.	Chinook Number	Sockeye Number	Coho Number	Steelhead Number	Total Number
	Max.	Min.	Max.	Min.						
Aug. 1	95	70	63	62	180,400	305	503	0	17	825
2	92	71	62	61	181,700	614	583	0	40	1,237
3	75	61	62	62	182,900	466	489	0	17	972
4	75	57	63	62	179,200	558	360	0	26	944
5	78	57	62	61	186,500	450	273	0	47	770
6	74	61	62	62	173,400	541	196	0	27	764
7	71	61	62	62	151,800	681	174	0	27	882
8	80	57	63	62	152,800	507	168	0	34	709
9	85	56	62	61	139,100	316	94	0	31	441
10	84	61	62	60	123,300	693	76	0	37	806
11	90	63	61	60	107,900	586	116	0	48	750
12	86	62	61	60	116,600	196	116	0	49	361
13	85	56	62	61	108,700	652	100	0	41	793
14	91	58	62	61	104,800	272	67	0	48	387
15	93	62	62	62	101,900	278	65	0	44	387
16	88	64	62	62	99,800	224	101	0	61	386
17	88	61	63	62	101,900	207	59	0	60	326
18	84	59	62	62	110,900	308	65	0	44	417
19	90	61	62	62	104,800	174	52	0	46	272
20	92	65	63	62	97,000	214	63	0	59	336
21	84	64	63	62	97,000	251	43	0	37	331
22	87	60	63	62	108,600	371	61	0	50	482
23	87	59	63	62	111,700	129	38	0	57	224
24	92	66	63	62	111,300	133	30	0	51	214
25	87	65	63	62	107,400	165	38	0	43	246
26	75	63	63	62	104,800	206	29	0	75	310
27	74	54	62	61	106,300	248	54	1	66	369
28	75	61	62	61	101,900	190	39	0	49	278
29	83	54	62	61	97,700	163	38	0	51	252
30	87	56	62	62	94,300	152	36	0	64	252
31	93	62	63	62	84,900	122	17	0	38	177

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 13.--Daily Temperatures, stream flow, and fish count data, Rock Island Dam, September 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow	Chinook	Sockeye	Coho	Steelhead	Total
	Max.	Min.	Max.	Min.						
	°F	°F	°F	°F	C. f. s.	Number	Number	Number	Number	Number
Sept. 1	92	66	63	62	83,600	245	35	0	38	318
2	86	63	63	62	88,200	166	27	1	68	262
3	83	61	63	62	89,500	180	15	0	44	239
4	87	55	63	62	70,800	208	18	0	40	266
5	89	54	63	62	77,100	210	22	1	68	301
6	95	65	63	62	60,500	88	10	1	38	137
7	72	66	63	62	68,500	147	15	0	68	230
8	70	47	63	62	43,400	136	12	2	76	226
9	77	46	63	62	54,900	253	28	0	86	367
10	66	61	62	61	77,800	291	9	3	92	395
11	69	54	62	61	67,900	179	11	2	87	279
12	69	49	61	60	62,200	269	3	0	70	342
13	72	60	61	61	56,000	394	7	4	92	497
14	69	51	61	60	44,300	306	8	11	97	422
15	74	51	61	60	44,300	142	7	5	79	233
16	86	52	61	60	45,200	187	9	7	96	299
17	82	50	62	61	58,800	245	6	7	80	338
18	84	55	62	61	44,300	163	1	5	56	225
19	86	70	62	62	41,900	186	2	11	121	320
20	90	59	62	62	35,800	244	4	26	123	397
21	91	63	62	62	42,300	212	2	25	132	371
22	85	64	63	62	35,900	406	5	26	153	590
23	84	53	63	62	38,200	197	5	36	194	432
24	86	54	63	62	48,700	194	4	47	234	479
25	80	54	64	63	51,200	160	3	31	212	406
26	85	54	63	63	51,200	263	4	66	188	521
27	75	61	63	62	48,200	153	3	70	262	488
28	60	53	62	62	47,800	168	3	56	284	511
29	67	48	62	61	53,800	107	3	36	141	287
30	72	43	62	61	44,800	64	1	25	110	200

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 14.--Daily temperatures, stream flow, and fish count data, Rock Island Dam, October 1962

Date	Air temperatures ¹		Water temperatures ²		Stream flow	Chinook	Sockeye	Coho	Steelhead	Total
	Max.	Min.	Max.	Min.						
	°F	°F	°F	°F	C.f.s.	Number	Number	Number	Number	Number
Oct. 1	74	45	--	--	49,700	92	2	26	184	304
2	75	51	--	--	45,600	77	1	27	156	261
3	70	53	--	--	45,600	91	2	5	153	251
4	69	47	--	--	47,800	24	0	33	137	194
5	64	44	--	--	46,500	62	1	17	116	196
6	63	48	--	--	34,700	42	0	18	91	151
7	51	38	--	--	40,200	31	3	18	60	112
8	58	35	59	59	45,600	16	1	9	80	106
9	58	44	59	59	45,600	15	0	13	86	114
10	51	44	59	58	38,000	25	2	8	76	111
11	49	45	59	58	37,300	11	0	8	39	58
12	50	45	58	57	48,700	12	1	9	56	78
13	65	46	58	57	46,900	20	1	7	51	79
14	62	43	57	57	69,600	19	0	3	37	59
15	62	45	58	57	54,300	14	0	7	60	81
16	58	37	58	57	39,400	9	0	2	54	65
17	64	41	58	57	50,200	16	0	0	47	63
18	63	44	58	57	46,500	9	0	3	22	34
19	58	43	58	58	52,200	11	0	1	17	29
20	64	47	58	58	48,200	14	0	2	42	58
21	70	47	58	58	46,100	6	0	0	23	29
22	68	48	59	59	50,200	10	0	0	47	57
23	70	43	59	58	46,900	21	0	1	51	73
24	67	44	59	58	75,900	6	0	3	34	43
25	64	45	58	58	75,900	10	0	5	53	68
26	58	42	58	58	74,600	2	0	4	34	40
27	54	42	58	58	55,400	5	0	3	25	33

¹ Air temperatures, taken with pocket thermometer, are given in degrees Fahrenheit.² Water temperatures, taken with recording thermograph at middle ladder, are given in degrees Fahrenheit.

Table 15.--Miscellaneous fish count, Rock Island Dam, May 1962

[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow trout	Total
May 1	4	0	22	0	0	0	0	0	0	26
2	6	1	41	0	0	0	0	0	0	48
3	4	0	57	0	0	0	0	0	0	61
4	18	0	150	0	0	0	0	0	0	168
5	10	0	111	0	0	0	0	0	0	121
6	16	0	85	0	0	0	0	0	0	101
7	30	9	72	0	0	0	0	0	0	111
8	14	13	70	0	0	0	0	0	0	97
9	109	2	68	0	0	0	0	0	0	179
10	53	0	50	0	0	0	0	0	0	103
11	21	6	52	0	0	0	0	0	0	79
12	22	4	93	0	0	0	0	0	0	119
13	38	6	108	0	0	0	0	0	1	153
14	119	56	96	0	0	0	0	0	0	271
15	371	18	55	0	0	0	0	0	0	444
16	248	13	33	0	0	0	0	0	0	294
17	266	69	38	0	0	0	0	0	0	373
18	299	40	38	0	0	0	0	0	0	377
19	97	19	32	0	0	0	0	0	1	149
20	40	7	44	0	0	0	0	0	0	91
21	44	11	18	0	0	0	0	0	1	74
22	197	19	43	1	0	0	0	0	0	260
23	172	12	31	0	0	0	0	0	0	215
24	1,264	5	27	34	0	0	0	0	0	1,330
25	1,196	13	35	15	0	0	0	0	0	1,259
26	1,384	49	37	28	0	0	0	0	3	1,501
27	1,762	96	17	15	0	0	0	0	0	1,890
28	501	17	20	47	0	0	0	0	0	585
29	227	10	12	27	0	0	0	0	1	277
30	117	34	12	2	0	0	0	0	0	165
31	166	31	4	8	0	0	0	0	0	209
Total	8,815	560	1,571	177	0	0	0	0	7	11,130

Table 16.--Miscellaneous fish count, Rock Island Dam, June 1962

[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow trout	Total
June 1	261	40	7	36	0	0	0	0	0	344
2	714	54	30	36	0	0	0	0	0	834
3	155	13	0	1	0	0	0	0	0	169
4	31	3	0	6	0	0	0	0	0	40
5	195	16	9	26	0	0	0	1	0	247
6	125	38	12	20	0	0	0	0	0	195
7	675	106	33	34	0	0	0	0	0	848
8	3,520	33	39	37	0	0	0	0	0	3,629
9	884	77	40	56	0	0	0	0	0	1,057
10	592	75	12	54	0	0	0	0	0	733
11	371	22	6	24	0	0	0	0	0	423
12	218	44	9	14	0	0	0	0	0	285
13	133	45	13	11	0	0	0	0	0	202
14	107	106	22	14	0	0	0	0	0	249
15	397	162	56	79	0	0	0	0	0	694
16	1,988	349	34	214	3	0	0	0	0	2,588
17	1,083	123	12	93	0	0	0	0	1	1,312
18	479	118	12	64	3	0	0	0	1	677
19	309	133	4	92	2	0	0	0	0	540
20	984	222	35	32	1	1	0	2	0	1,277
21	1,734	279	21	80	0	0	0	0	0	2,114
22	1,859	179	8	57	1	0	0	0	1	2,105
23	1,565	126	20	30	6	0	0	0	0	1,747
24	1,237	125	13	36	1	0	0	0	0	1,412
25	1,672	169	19	96	3	2	0	0	1	1,962
26	1,838	153	29	86	5	2	0	0	0	2,113
27	942	166	16	45	4	3	0	0	0	1,176
28	1,652	143	21	30	2	1	0	0	0	1,849
29	1,573	99	12	59	3	1	0	0	0	1,747
30	1,147	63	26	37	19	1	0	0	0	1,293
Total	28,440	3,281	570	1,499	53	11	0	3	4	33,861

Table 17.--Miscellaneous fish count, Rock Island Dam, July 1962

[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow Trout	Total
July 1	1,063	132	27	89	15	3	0	0	1	1,330
2	1,886	64	4	39	12	0	0	1	0	1,006
3	870	60	7	40	11	0	0	0	1	989
4	743	44	7	35	20	0	0	0	0	849
5	554	43	3	39	8	0	0	0	0	647
6	1,113	117	13	83	20	0	0	0	0	1,346
7	729	139	21	49	15	0	0	0	0	953
8	3,091	311	4	152	24	5	0	0	8	3,595
9	3,436	142	3	154	17	0	0	0	0	3,752
10	2,352	114	7	93	31	1	0	0	0	2,598
11	1,239	103	7	66	40	1	0	0	0	1,456
12	767	101	5	69	31	3	0	0	0	976
13	410	107	9	58	24	5	0	0	0	613
14	457	77	2	34	24	1	0	0	0	595
15	774	115	0	94	26	3	0	0	0	1,012
16	627	40	5	35	38	2	0	0	1	748
17	324	40	4	45	30	0	0	0	0	443
18	237	26	12	22	20	0	0	0	0	317
19	183	41	4	49	16	0	0	0	0	293
20	174	53	17	32	66	0	0	0	0	342
21	271	108	52	122	32	0	0	0	0	585
22	734	99	25	95	24	0	0	0	0	977
23	1,112	212	6	143	32	1	0	0	1	1,507
24	1,540	101	8	122	62	2	0	1	0	1,836
25	640	57	5	63	22	3	0	0	0	790
26	560	56	12	68	40	1	0	0	0	737
27	495	123	36	66	58	4	0	0	0	782
28	438	128	24	104	60	8	0	0	0	762
29	408	139	19	134	63	12	0	0	3	778
30	856	83	10	47	98	5	0	0	0	1,099
31	1,081	94	10	40	92	6	0	0	2	1,325
Total	28,164	3,069	368	2,281	1,071	66	0	2	17	35,038

Table 18.--Miscellaneous fish count, Rock Island Dam, August 1962

[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow Trout	Total
Aug. 1	543	71	14	16	37	7	0	0	0	688
2	471	49	17	11	38	4	0	0	1	591
3	443	64	11	16	77	3	0	1	2	617
4	226	12	7	13	25	26	0	0	0	309
5	109	23	9	16	26	38	0	0	1	222
6	172	26	10	16	17	3	0	0	2	246
7	828	42	19	14	25	10	0	0	0	938
8	788	45	16	11	26	5	0	0	0	891
9	348	20	12	2	21	2	0	0	0	405
10	710	14	13	10	22	5	0	0	0	774
11	949	34	35	10	22	18	0	0	0	1,068
12	1,362	67	48	23	22	9	0	0	0	1,531
13	942	26	31	19	10	5	0	0	1	1,034
14	829	70	43	101	13	8	1	0	1	1,066
15	711	46	33	67	8	39	0	0	1	905
16	687	85	61	133	13	22	0	0	0	1,001
17	492	57	34	62	9	62	0	0	1	717
18	547	68	51	134	8	101	0	0	0	909
19	351	50	31	117	9	63	0	0	1	622
20	449	61	55	105	6	206	0	0	0	882
21	326	51	54	135	12	98	0	0	0	676
22	385	39	24	68	12	42	0	0	0	570
23	518	54	20	64	19	72	0	0	0	747
24	435	40	27	48	18	107	0	0	0	675
25	548	109	39	92	24	90	0	0	0	902
26	365	74	33	89	11	82	0	0	0	654
27	321	26	28	28	6	44	0	0	2	455
28	365	33	28	105	5	19	0	0	0	555
29	840	76	18	107	3	44	0	0	1	1,089
30	625	61	32	132	8	53	0	0	0	911
31	737	57	25	116	3	93	0	0	0	1,031
Total	17,422	1,550	878	1,880	555	1,380	1	1	14	23,681

Table 19.--Miscellaneous fish count, Rock Island Dam, September 1962

[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow trout	Total
Sept. 1	775	76	43	143	6	157	0	0	0	1,200
2	785	52	43	107	4	48	0	1	0	1,040
3	540	26	12	111	5	58	0	0	0	752
4	579	14	43	199	1	124	0	0	0	960
5	733	27	43	194	0	91	0	0	0	1,088
6	638	41	53	208	2	67	0	0	0	1,009
7	782	14	65	160	0	54	0	0	0	1,075
8	777	44	85	161	3	18	0	0	0	1,088
9	635	22	124	276	4	14	0	0	0	1,075
10	765	27	74	280	4	53	0	0	0	1,203
11	387	7	67	133	2	17	0	0	1	614
12	364	27	77	132	2	75	0	0	0	677
13	485	20	51	45	2	18	0	0	0	622
14	657	27	60	98	2	39	0	0	1	883
15	464	39	72	120	1	25	0	0	0	721
16	608	61	145	236	1	77	0	0	0	1,128
17	392	52	99	116	2	122	0	0	0	783
18	358	51	195	137	1	8	0	0	0	750
19	803	98	231	147	0	5	0	0	0	1,284
20	437	41	277	45	0	7	0	0	0	808
21	409	37	407	62	6	6	0	0	1	928
22	205	41	346	62	2	33	0	1	1	690
23	211	81	245	27	7	23	0	0	0	594
24	295	89	345	163	2	38	0	0	0	932
25	295	83	577	128	0	27	0	0	0	1,110
26	537	132	445	87	4	17	0	0	0	1,222
27	200	165	581	103	1	5	0	0	0	1,055
28	371	82	569	82	8	6	0	0	0	1,118
29	92	28	696	36	0	27	0	0	1	880
30	131	77	884	56	0	25	0	0	0	1,173
Total	14,710	1,581	6,954	3,854	72	1,284	0	2	5	28,462

Table 20.--Miscellaneous fish count, Rock Island Dam, October 1962

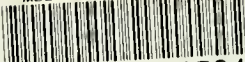
[Number of fish]

Date	Sucker	Squawfish	Whitefish	Chub	Carp	Lamprey	Shad	Dolly Varden	Rainbow trout	Total
Oct. 1	564	60	651	39	0	38	0	0	0	1,352
2	238	39	500	61	1	9	0	0	0	848
3	158	35	600	34	0	18	0	0	0	845
4	230	57	666	62	0	32	0	0	0	1,047
5	146	59	823	30	0	36	0	0	0	1,094
6	125	25	647	29	1	29	0	0	0	856
7	229	73	626	29	0	6	0	0	0	963
8	16	38	1,592	16	0	1	0	0	0	1,663
9	29	59	1,265	17	0	3	0	0	0	1,373
10	111	55	785	2	0	10	0	0	0	963
11	104	52	505	6	0	5	0	0	1	673
12	31	16	791	5	0	1	0	0	0	844
13	20	22	588	22	1	3	0	0	1	657
14	20	20	1,057	8	0	6	0	0	0	1,111
15	71	49	1,242	4	0	1	0	1	1	1,369
16	50	13	840	3	1	2	0	0	1	910
17	324	21	744	2	0	3	0	1	0	1,095
18	95	32	836	13	0	12	0	0	0	988
19	21	12	928	5	0	6	0	0	0	972
20	30	15	1,325	5	0	3	0	0	0	1,378
21	44	39	1,230	2	0	7	0	0	0	1,322
22	49	33	863	6	0	6	0	0	0	957
23	29	15	1,350	0	1	3	0	0	0	1,398
24	40	10	1,566	3	0	2	0	0	0	1,621
25	38	34	2,720	5	0	2	0	0	0	2,799
26	20	12	1,752	5	0	8	0	0	0	1,797
27	18	8	1,476	1	0	4	0	0	0	1,507
Total	2,850	903	27,968	414	5	256	0	2	4	32,402

Table 21.--Injured fish observed at Rock Island Dam, May 1-October 27, 1962

[Number of fish]

Date	Species	Total fish counted	Injured fish observed			
			Left ladder	Middle ladder	Right ladder	Total
May 1-15	Chinook	3,436	30	4	4	38
	Chinook jacks	164				
	Steelhead	463	2	2	1	5
May 16-31	Chinook	2,037	15	2		17
	Chinook jacks	230				
	Sockeye	2				
	Steelhead	268				
June 1-15	Chinook	622	11	1		12
	Chinook jacks	298				
	Sockeye	5				
	Steelhead	41				
June 16-30	Chinook	1,696	16	1	5	22
	Chinook jacks	291	1			1
	Sockeye	45				
	Steelhead	17				
July 1-15	Chinook	3,885	30	2	12	44
	Chinook jacks	337				
	Sockeye	3,392	3		2	5
	Steelhead	14				
July 16-31	Chinook	2,691	16	3	1	20
	Chinook jacks	1,263	1			1
	Sockeye	21,370	21	7	26	54
	Steelhead	144				
Aug. 1-15	Chinook	5,311	27	4	7	38
	Chinook jacks	1,804				
	Sockeye	3,380	13	2	8	23
	Steelhead	533				
Aug. 16-31	Chinook	2,081	11	2	2	15
	Chinook jacks	1,176				
	Sockeye	763	7		1	8
	Steelhead	851				
Sept. 1-15	Chinook	2,354	12	4	1	17
	Chinook jacks	860				
	Sockeye	227	4			4
	Steelhead	1,043	1			1
	Coho	30				
Sept. 16-30	Chinook	2,355	8	2	3	13
	Chinook jacks	594				
	Sockeye	55	1			1
	Steelhead	2,386	2		1	3
	Coho	474	1			1
Oct. 1-15	Chinook	463	6		4	10
	Chinook jacks	88				
	Sockeye	14				
	Steelhead	1,382	2		3	5
	Coho	208	2			2
Oct. 16-27	Chinook	106	2			2
	Chinook jacks	13				
	Steelhead	449	2			2
	Coho	24				
Totals		71,735	247	36	81	364



Created in 1849 the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES
WASHINGTON, D.C. 20240

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF THE INTERIOR

Return this sheet to above address, if you
do NOT wish to receive this material ☐
or if change of address is needed ☐ (indi-
cate change).

Librarian,

Marine Biological Lab.,

123 T

Woods Hole, Mass.

